

The documentation and process conversion measures necessary to comply with this revision shall be completed by 25 Apr 93.

INCH-POUND

MIL-S-19500/477B
25 January 1993
SUPERSEDING
MIL-S-19500/477A
11 April 1986

MILITARY SPECIFICATION

SEMICONDUCTOR DEVICE, DIODE, SILICON, FAST RECOVERY, POWER RECTIFIER,
TYPES 1N5802, 1N5804, 1N5806, 1N5807, 1N5809, AND 1N5811,
1N5802US, 1N5804US, 1N5806US, 1N5807US, 1N5809US, AND 1N5811US
JAN, JANTX, JANTXV, JANS, AND JANC

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the detail requirements for silicon, fast recovery, power rectifier diodes. Five levels of product assurance are provided for each device type as specified in MIL-S-19500.

1.2 Physical dimensions. See figures 2, 3, 4, and 5.

1.3 Maximum ratings. $T_A = +25^\circ\text{C}$, unless otherwise specified.

1.3.1 Ratings applicable to all part numbers.

$T_{STG} = -65^\circ\text{C}$ to $+200^\circ\text{C}$
 $T_{op} = -65^\circ\text{C}$ to $+175^\circ\text{C}$
 $T_J(\text{max}) = +175^\circ\text{C}$

1.3.2 Ratings applicable to individual types.

Types	V_{RWM}	I_{O1} $T_L = +75^\circ\text{C}$ 1/	I_{O2} $T_A = +55^\circ\text{C}$ 2/	I_{FSM} at $+25^\circ\text{C}$ Operating at I_{O2} $t_p = 8.3 \text{ ms}$	t_{rr}	$R_{\theta JL}$ at L = 0.375	$R_{\theta JL}$ at 7/
1N5802, 1N5802US	50	2.5 A 3/	1.0 A 4/	35 A(pk)	25 ns	36°C/W	20°C/W
1N5804, 1N5804US	100	2.5 A 3/	1.0 A 4/	35 A(pk)	25 ns	36°C/W	20°C/W
1N5806, 1N5806US	150	2.5 A 3/	1.0 A 4/	35 A(pk)	25 ns	36°C/W	20°C/W
1N5807, 1N5807US	50	6.0 A 5/	3.0 A 6/	125 A(pk)	30 ns	22°C/W	10°C/W
1N5809, 1N5809US	100	6.0 A 5/	3.0 A 6/	125 A(pk)	30 ns	22°C/W	10°C/W
1N5811, 1N5811US	150	6.0 A 5/	3.0 A 6/	125 A(pk)	30 ns	22°C/W	10°C/W

1/ $T_C = T_L$ at L = 0 or $T_{end \text{ tab}}$ for US suffix devices.

2/ This rating is independent of mounting or heat sinking.

3/ Derate at $25 \text{ mA}/^\circ\text{C}$ for T_C above $+75^\circ\text{C}$.

4/ Derate at $8.33 \text{ mA}/^\circ\text{C}$ for T_A above $+55^\circ\text{C}$.

5/ Derate at $60 \text{ mA}/^\circ\text{C}$ for T_C above $+75^\circ\text{C}$.

6/ Derate at $25 \text{ mA}/^\circ\text{C}$ for T_A above $+55^\circ\text{C}$.

7/ -US suffix devices only.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Defense Electronics Supply Center, ATTN: DESC-EC, 1507 Wilmington Pike, Dayton, OH 45444-5270, by using Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5961

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1.4 Primary electrical characteristics $T_A = +25^\circ\text{C}$, unless otherwise specified.

Types	V_{BR} (V dc)	I_{R1} at $V_R = V_{RHM}$	I_{R2} at $V_R = V_{RHM}$
		$T_A = +25^\circ\text{C}$ $\mu\text{A dc}$	$T_A = +100^\circ\text{C}$ $\mu\text{A dc}$
1N5802, 1N5802US	60	1.0	50
1N5804, 1N5804US	110	1.0	50
1N5806, 1N5806US	160	1.0	50
1N5807, 1N5807US	60	5.0	150
1N5809, 1N5809US	110	5.0	150
1N5811, 1N5811US	160	5.0	150

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

MILITARY

MIL-S-19500 - Semiconductor Devices, General Specification for.

STANDARDS

MILITARY

MIL-STD-750 - Test Methods for Semiconductor Devices.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Associated detail specification. The individual item requirements shall be in accordance with MIL-S-19500 and as specified herein.

3.2 Abbreviations, symbols, and definitions. Abbreviations, symbols, and definitions used herein shall be as specified in MIL-S-19500 and as follows:

V_{fr} Forward recovery voltage.

US Unleaded or surface mounted (square encapped diode).

3.3 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-S-19500 and on figures 2, 3, 4, and 5 herein.

3.3.1 Diode construction. These devices shall be constructed utilizing non-cavity double plug construction with high temperature metallurgical bonding between both sides of the silicon die and terminal pins (see MIL-S-19500). Metallurgical bond shall be in accordance with the requirements of category I in MIL-S-19500. US' version devices shall be structurally identical to the non-surface mount devices except for lead terminations.

3.3.2 Lead finish. Lead finish shall be solderable as defined in MIL-S-19500, MIL-STD-750, and herein.

3.4 Marking. Devices shall be marked as specified in MIL-S-19500.

3.4.1 Marking for US devices. For US version devices only, all marking may be omitted from the device except for the cathode marking. All marking which is omitted from the body of the device shall appear on the label of the initial container.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection shall be in accordance with MIL-S-19500, and as specified herein.

4.2 Qualification inspection. Qualification inspection shall be in accordance with MIL-S-19500.

4.2.1 Group E inspection. Group E inspection shall be conducted in accordance with MIL-S-19500 and table I herein.

4.3 Screening (JANS, JANTX, AND JANTXV levels only). Screening shall be in accordance with table II of MIL-S-19500, and as specified herein. The following measurements shall be made in accordance with table I herein. Devices that exceed the limits of table I herein shall not be acceptable.

Screen (see table II of MIL-S-19500)	Measurement	
	JANS level	JANTX and JANTXV levels
1/	Thermal impedance (see 4.5.2)	Thermal impedance (see 4.5.2)
9	I_{R1} and V_{FM1}	Not Applicable
11	I_{R1} and V_{FM1} ; $\Delta I_R \leq 100$ percent of initial reading or ± 150 nA dc (1N5802, 1N5804, 1N5806) or ± 500 nA dc (1N5807, 1N5809, 1N5811), whichever is greater. $\Delta V_{FM1} \leq \pm 0.05$ V dc.	I_{R1} and V_{FM1}
12	See 4.3.1	See 4.3.1
13 2/	Subgroups 2 and 3 of table I herein; $\Delta I_R \leq 100$ percent of initial reading or ± 150 nA dc (1N5802, 1N5804, 1N5806) or ± 500 nA dc (1N5807, 1N5809, 1N5811), whichever is greater. $\Delta V_{FM1} \leq \pm 0.05$ V dc. Scope-display evaluation (see 4.5.3).	Subgroup 2 of table I herein; $\Delta I_{R1} \leq 100$ percent of initial reading or ± 250 nA dc (1N5802, 1N5804, 1N5806) or ± 1 μ A dc (1N5807, 1N5809, 1N5811), whichever is greater. $\Delta V_{FM1} \leq \pm 0.05$ V dc. Scope-display evaluation (see 4.5.3).

1/ Thermal impedance shall be performed any time after screen 3.

2/ Except thermal impedance, if already performed.

4.3.1 Power burn-in conditions. Power burn-in conditions are as follows:

T_A = Room ambient as defined in the general requirements of MIL-STD-750, (see 4.5).
 I_O = 1.0 A (1N5802, 1N5804, 1N5806).
 I_O = 3.0 A (1N5807, 1N5809, 1N5811).
 V_R = rated V_{RWM} (see 1.3.2), f = 50-60 Hz.

4.3.1.1 Alternate Mounting Conditions (for -US devices). At the option of the manufacturer, any clips or heat sink mounting configurations may be utilized provided that one of the following conditions be met:

- a. T_{EC} = +75°C to +125°C, V_{RWM} = rated, f = 50-60 Hz, I_O = rated I_{O2} (see 1.3.2).
- b. Temporary attachment of leads or equivalent (thermal properties not to exceed the leaded part) T_J shall not exceed $T_{OP(max)}$, f = 50-60 Hz. I_O = $I_{O2}(rated)$, T_J = +150°C \pm 25°C, V_{RWM} = rated, 50-60 Hz.

4.4 Quality conformance inspection. Quality conformance inspection shall be in accordance with MIL-S-19500.

4.4.1 Group A inspection. Group A inspection shall be conducted in accordance with MIL-S-19500 and table I herein.

4.4.2 Group B inspection. Group B inspection shall be conducted in accordance with the conditions specified for subgroup testing in table IVa (JANS) and table IVb (JAN, JANTX, and JANTXV) of MIL-S-19500. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of table III herein.

4.4.2.1 Group B inspection, table IVa (JANS) of MIL-S-19500.

- a. Subgroup 3: Condition for surge current are as follows:
 I_{FSM} = rated (see 1.3), 10 surges of 8.3 ms each at 1 minute intervals, superimposed on I_O = I_{O2} rated (see 1.3); V_{RSM} = rated (see 1.3); T_A = +25°C.
- b. Subgroup 4: Condition for intermittent operation life are as follows:
 I_O = I_{O2} rated (see 1.3.2 and 4.3.1); V_R = rated V_{RWM} (see 1.3.2 and 4.3.1); f = 60 Hz;
 t_{on} = t_{off} = 3 minutes for minimum for 2,000 cycle. T_A = +55°C.
- c. Subgroup 5: Condition for steady-state operation life (accelerated) are as follows:
 $I_O \geq I_{O2}$ rated minimum (see 1.3.2); V_R = rated V_{RWM} (see 1.3.2 and 4.3.1); f = 60 Hz,
 T_A = +150°C min. Adjust T_A or I_O to achieve an average $T_J \geq 250^\circ\text{C}$.
- d. Subgroup 6: Condition for thermal resistance are as follows:
 See 4.5.1 and figure 5; maximum $R_{\theta JL}$ shall be as specified on table IV herein.

4.4.2.2 Group B inspection, table IVb (JAN, JANTX and JANTXV of MIL-S-19500).

- a. Subgroup 2: Condition for surge current are as follows:
 I_{FSM} = rated (see 1.3); 10 surges of 8.3 ms each at 1 minute intervals, superimposed on I_O = I_{O2} rated (see 1.3); V_{RSM} = rated (see 1.3). T_A = +25°C.
- b. Subgroup 3: Condition for steady-state operation life are as follows:
 I_O = I_{O2} rated (see 1.3.2 and 4.3.1); f = 60 Hz; V_R = V_{RWM} rated (see 1.3.2 and 4.3.1)
 T_A = room ambient as defined in the general requirements of MIL-STD-750, paragraph 4.5.
- c. Subgroup 5: Not applicable.
- d. Subgroup 6: Condition for high temperature life (non-operating) is T_A = +175°C.

4.4.3 Group C inspection. Group C inspection shall be conducted in accordance with the conditions specified for subgroup testing in table V of MIL-S-19500. Electrical measurements (end-points) and delta requirements shall be in accordance with the applicable steps of table III herein.

4.4.3.1 Group C inspection, table V of MIL-S-19500.

- a. Subgroup 2: Condition for terminal strength are as follows: (not applicable to US types)

Tension: MIL-STD-750, test method 2036, condition A, 4 lbs - 1N5802, 1N5804, 1N5806
5 lbs - 1N5807, 1N5809, 1N5811
Fatigue: MIL-STD-750, test method 2036, condition E, 2 lbs.

- b. Subgroup 3: Not applicable.

- c. Subgroup 6: Condition for steady-state operation life are as follows:

$I_0 = I_{O2}$ rated; T_A = room ambient as defined in the general requirements of MIL-STD-750, paragraph 4.5; $f = 60$ Hz; $V_R = V_{RUM}$ rated (see 1.3.2 and 4.3.1); T_A = room ambient as defined in the general requirements of paragraph 4.5 of MIL-STD-750.

4.5 Methods of inspection. Methods of inspection shall be as specified in the appropriate tables as follows.

4.5.1 Thermal resistance. Thermal resistance shall be measured in accordance with MIL-STD-750, method 3101 or 4081. Read and record data in accordance with group E herein and shall be included in the qualification report. Forced moving air or draft shall not be permitted across the device during test. The maximum limit for $R_{\theta JL}$ or $R_{\theta JE}$ under these test conditions shall be as specified in paragraph 1.3.2. The following conditions shall apply.

	1N5802, 1N5804, 1N5806	1N5807, 1N5809, 1N5811
$I_H =$	2.0 A dc minimum	2.0 A dc minimum
$I_M =$	10 mA	10 mA
$\tau_{MD} =$	250 μ s maximum	250 μ s maximum

The device shall be allowed to reach thermal equilibrium at current I_H before the measurement shall be made.

Lead spacing: $L = 3/8$ inches for leaded devices
 $L = 0$ (endcap mount) for -US devices.

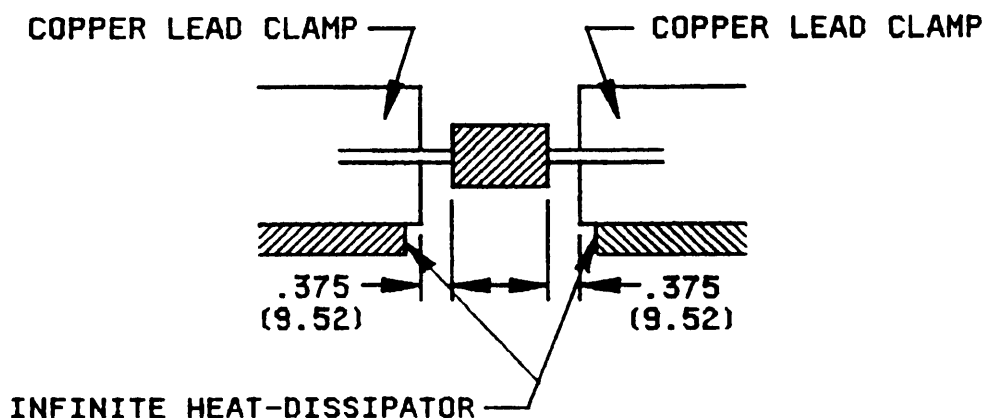


FIGURE 1. Mounting arrangement.

TABLE I. Group A inspection.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 1</u>						
Visual and mechanical examination	2071					
<u>Subgroup 2</u>						
Thermal impedance	3101	see 4.5.2	$Z_{\theta JX}$			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US					4.5	$^{\circ}\text{C/W}$
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US					1.5	$^{\circ}\text{C/W}$
Forward voltage	4011	Duty cycle $\leq 2\%$ (pulsed); $t_p = 8.3 \text{ ms (max)}$	V_{FM1}			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US		$I_{FM} = 1.0 \text{ A(pk)}$			0.875	V (pk)
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US		$I_{FM} = 4.0 \text{ A(pk)}$			0.875	V (pk)
Forward voltage	4011	Duty cycle $\leq 2\%$ (pulsed); $t_p = 8.3 \text{ ms (max)}$	V_{FM2}			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US		$I_{FM} = 2.5 \text{ A(pk)}$			0.975	V (pk)
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US		$I_{FM} = 6.0 \text{ A(pk)}$			0.925	V (pk)
Reverse current	4016	DC method	I_{R1}			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US		$V_R = 50 \text{ V dc}$ $V_R = 100 \text{ V dc}$ $V_R = 150 \text{ V dc}$			1.0 1.0 1.0	$\mu\text{A dc}$ $\mu\text{A dc}$ $\mu\text{A dc}$
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US		$V_R = 50 \text{ V dc}$ $V_R = 100 \text{ V dc}$ $V_R = 150 \text{ V dc}$			5.0 5.0 5.0	$\mu\text{A dc}$ $\mu\text{A dc}$ $\mu\text{A dc}$

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 2</u> - Continued						
Breakdown voltage	4021	$I_R = 100 \mu A$ dc	$V_{(BR)1}$			
1N5802, 1N5802US 1N5807, 1N5807US				60	-----	V dc
1N5804, 1N5804US 1N5809, 1N5809US				110	-----	V dc
1N5806, 1N5806US 1N5811, 1N5811US				160	-----	V dc
<u>Subgroup 3</u>						
High temperature operation		$T_A = +100^\circ C$				
Reverse current	4016	DC method	I_{R2}			
1N5802, 1N5802US		$V_R = 50$ V dc			50	μA dc
1N5804, 1N5804US		$V_R = 100$ V dc			50	μA dc
1N5806, 1N5806US		$V_R = 150$ V dc			50	μA dc
1N5807, 1N5807US		$V_R = 50$ V dc			150	μA dc
1N5809, 1N5809US		$V_R = 100$ V dc			150	μA dc
1N5811, 1N5811US		$V_R = 150$ V dc			150	μA dc
Forward voltage	4011	Duty cycle $\leq 2\%$ (pulsed); $t_p = 8.3$ ms (max)	V_{FM3}			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US		$I_{FM} = 1.0$ A(pk)			0.800	V (pk)
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US		$I_{FM} = 4.0$ A(pk)			0.800	V (pk)
Low-temperature operation		$T_A = -65^\circ C$				
Forward voltage	4011	Duty cycle $\leq 2\%$ (pulsed); $t_p = 8.3$ ms (max)	V_{FM4}			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US		$I_{FM} = 1.0$ A(pk)			1.075	V (pk)
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US		$I_{FM} = 4.0$ A(pk)			1.075	V (pk)

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 3</u> - Continued						
Breakdown voltage	4021	$I_R = 100 \mu A$ dc	$V_{(BR)2}$			
1N5802, 1N5802US 1N5807, 1N5807US				50	-----	V dc
1N5804, 1N5804US 1N5809, 1N5809US				100	-----	V dc
1N5806, 1N5806US 1N5811, 1N5811US				150	-----	V dc
<u>Subgroup 4</u>						
Reverse recovery time	4031	Condition B	t_{rr}			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US		$I_F = I_R = 0.5 A$; $I_{RM}(REC) = 0.05 A(pk)$; $di/dt = 65 A/\mu s$ (min)			25	ns
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US		$I_F = I_R = 1.0 A$; $I_{RM}(REC) = 0.1 A(pk)$; $di/dt = 100 A/\mu s$ (min)			30	ns
Capacitance	4001	$V_R = 10 V$; $f = 1 Mhz$; $V_{sig} = 50 mV$ (p-p) (max)	C_J			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US					25	pF
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US					60	Pf
Forward recovery voltage	4026	$t_r = 8 ns$	V_{FRM}			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US		$I_{FM} = 250 mA$			2.2	V (pk)
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US		$I_{FM} = 500 mA$			2.2	V (pk)

See footnote at end of table.

TABLE I. Group A inspection - Continued.

Inspection 1/	MIL-STD-750		Symbol	Limits		Unit
	Method	Conditions		Min	Max	
<u>Subgroup 4</u> - Continued						
Forward recovery time	4026	$t_r = 8 \text{ ns}$ measured to $1.1 \times V_f$	t_{fr}			
1N5802, 1N5802US 1N5804, 1N5804US 1N5806, 1N5806US		$I_{FM} = 250 \text{ mA(pk)}$			15	ns
1N5807, 1N5807US 1N5809, 1N5809US 1N5811, 1N5811US		$I_{FM} = 500 \text{ mA(pk)}$			15	ns
<u>Subgroups 5, 6, 7</u>						
Not applicable						

1/ For sampling plan, see MIL-S-19500.

TABLE II. Group E inspection (all quality levels) for qualification only.

Inspection 1/	MIL-STD-750		Sampling plan
	Method	Conditions	
<u>Subgroup 1</u>			32 devices $c = 0$
Thermal shock (glass strain)	1056	500 cycles; condition A	
Hermetic seal	1071		
Electrical measurement		See table III, steps 1 and 2	
<u>Subgroup 2</u>			32 devices $c = 0$
Blocking life	1048	$t = 1,000 \text{ hours}$; $T_A = 150^\circ\text{C}$; $V_R \text{ dc} = 0.8 - 0.85\% \text{ rated } V_{RWM}$ (see 1.3.2)	
Electrical measurement		See table III steps 1 and 2	
<u>Subgroup 3</u>			
Not applicable			
<u>Subgroup 4</u>			22 devices $c = 0$
Thermal resistance, junction to lead	3101 or 4081	See 4.5.1	

TABLE III. Groups B and C electrical measurements. 1/ 2/ 3/

Step	Inspection	MIL-STD-750		Symbol	Limits		Unit
		Method	Conditions		Min	Max	
1	Forward voltage	4011	Duty cycle $\leq 2\%$ (pulsed); $t_p = 8.3 \text{ ms (max)}$	V_{FM1}			
	1N5802, 1N5804, 1N5806		$I_{FM} = 1.0 \text{ A(pk)}$			0.875	V (pk)
	1N5807, 1N5809, 1N5811		$I_{FM} = 4.0 \text{ A(pk)}$			0.875	V (pk)
2	Reverse current	4016	DC method	I_{R1}			
	1N5802		$V_R = 50 \text{ V dc}$			1.0	$\mu\text{A dc}$
	1N5804		$V_R = 100 \text{ V dc}$			1.0	$\mu\text{A dc}$
	1N5806		$V_R = 150 \text{ V dc}$			1.0	$\mu\text{A dc}$
	1N5807		$V_R = 50 \text{ V dc}$			5.0	$\mu\text{A dc}$
	1N5809		$V_R = 100 \text{ V dc}$			5.0	$\mu\text{A dc}$
	1N5811		$V_R = 150 \text{ V dc}$			5.0	$\mu\text{A dc}$
3	Forward voltage	4011	Duty cycle $\leq 2\%$ (pulsed); $t_p = 8.3 \text{ ms (max)}$	$\Delta V_{F1} \text{ 4/}$			
	1N5802, 1N5804, 1N5806		$I_{FM} = 1.0 \text{ A(pk)}$				
	1N5807, 1N5809, 1N5811		$I_{FM} = 4.0 \text{ A(pk)}$				$\pm 50 \text{ mV dc change from reading initial}$
4	Reverse current	4016	DC method;	$\Delta I_{R1} \text{ 4/}$			
	1N5802		$V_R = 50 \text{ V dc}$				
	1N5804		$V_R = 100 \text{ V dc}$				
	1N5806		$V_R = 150 \text{ V dc}$				100% or $\pm 150 \text{ nA dc change from initial reading, whichever is greater.}$
	1N5807		$V_R = 50 \text{ V dc}$				
	1N5809		$V_R = 100 \text{ V dc}$				
	1N5811		$V_R = 150 \text{ V dc}$				100% or $\pm 500 \text{ nA dc change from initial reading, whichever is greater.}$

1/ The electrical measurements for table IVa (JANS) of MIL-S-19500 are as follows:

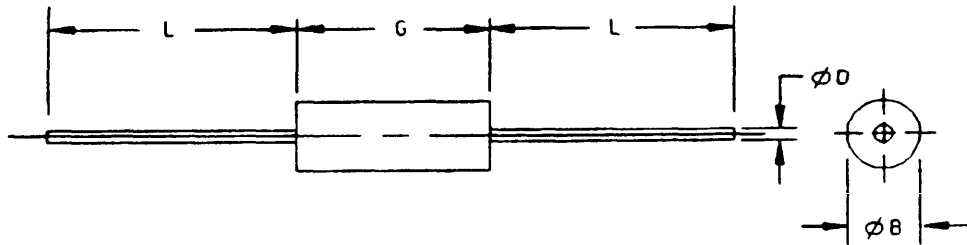
- Subgroup 3, see table III herein, steps 1 and 2.
- Subgroup 4, see table III herein, steps 1, 2, and 3.
- Subgroup 5, see table III herein, steps 1, 2, 3, and 4.

2/ The electrical measurements for table IVb (JANTX and JANTXV) of MIL-S-19500 are as follows: Subgroup 2, 3, and 6, see table III herein, steps 1 and 2.

3/ The electrical measurements for table V of MIL-S-19500 are as follows:

- Subgroup 2, see table III herein, steps 1, 2, 3, and 4 for JANS and steps 1 and 2 for JANTX and JANTXV.
- Subgroup 6, see table III herein, steps 1, 2, 3, and 4 for JANS and steps 1 and 2 for JANTX and JANTXV.

4/ Devices which exceed the group A limits for this test shall not be accepted.



Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
ØB	.065	.085	1.65	2.16
ØD	.027	.032	0.69	0.81
G	.125	.250	3.18	6.35
L	.700	1.300	17.78	33.02

1N5802, 1N5804, 1N5806

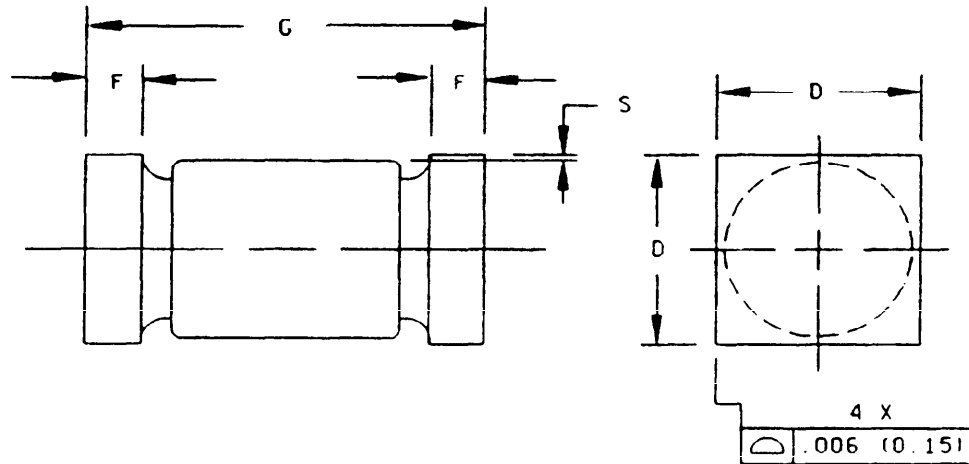
Symbol	Dimensions				Notes
	Inches		Millimeters		
	Min	Max	Min	Max	
ØB	.110	.180	2.79	4.57	4
ØD	.037	.042	0.94	1.07	3
G	.130	.300	3.30	7.62	3
L	.900	1.300	22.86	33.02	

1N5807, 1N5809, 1N5811

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Dimension G shall include the sections of the lead over which the diameter is uncontrolled. This uncontrolled area is defined as the zone between the edge of the diode body and extending .050 inch (1.27 mm) onto the leads.
4. Dimension ØB shall be measured at the largest diameter.

FIGURE 2. Physical dimensions.



Symbol	D - 5A			
	Inches		Millimeters	
	Min	Max	Min	Max
D	.091	.103	2.31	2.62
F	.019	.028	0.48	0.71
G	.168	.200	4.29	5.08
S	.003	----	.080	----

1N5802US, 1N5804US, 1N5806US

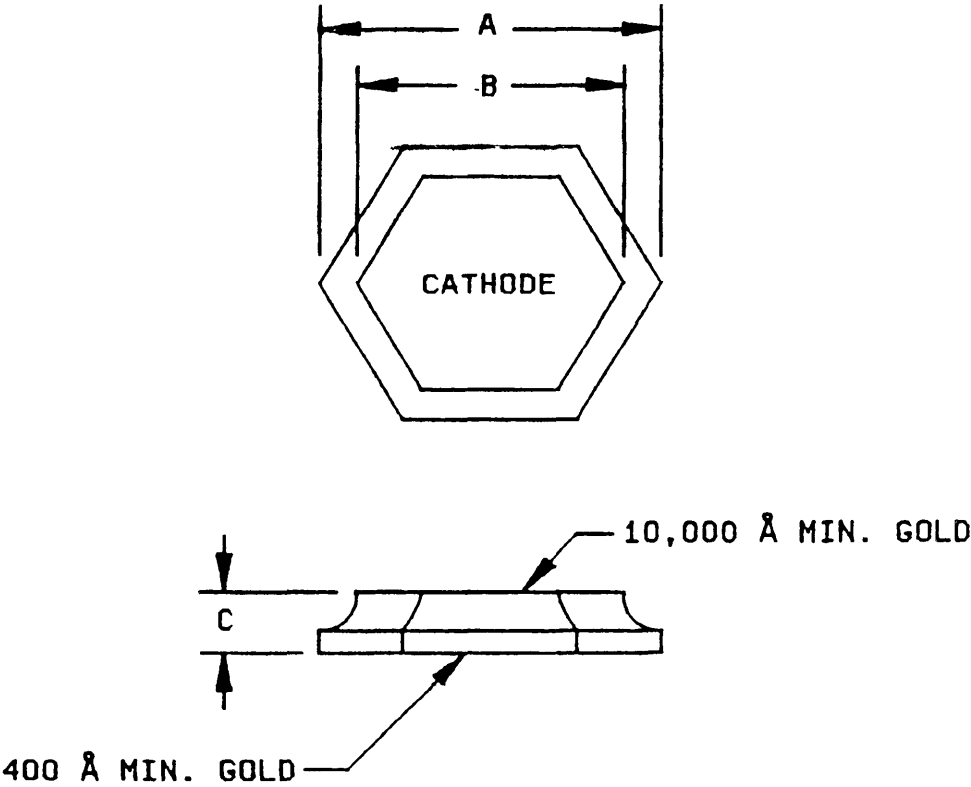
Symbol	D - 5B			
	Inches		Millimeters	
	Min	Max	Min	Max
D	.137	.148	3.48	3.76
F	.019	.028	0.48	0.71
G	.200	.225	5.08	5.72
S	.003	----	.080	----

1N5807US, 1N5809US, 1N5811US

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Gap not controlled, shape of body and gap not controlled.
4. Dimensions are pre-solder dip.
5. Cathode marking to be either in color band, three dots spaced equally, or a color dot on the face of the end tab.
6. Color dots will be .020" diameter minimum and those on the face of the end tab shall not lie within .020" of the mounting surface.

FIGURE 3. Physical dimensions of surface mount family.



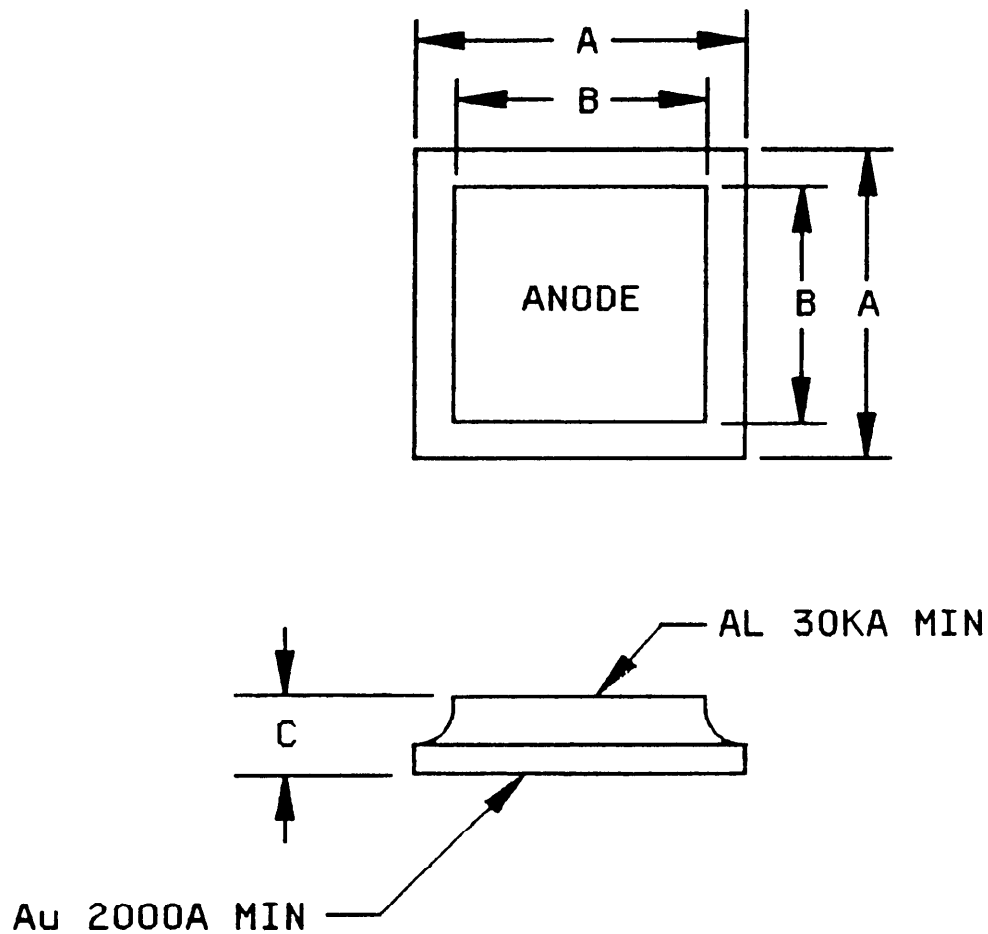
Symbol	Dimensions			
	Millimeters		Inches	
	Min	Max	Min	Max
A	1.19	1.35	.047	.053
B	0.84	0.94	.033	.037
C	0.18	0.28	.007	.011

1N5802, 1N5804, 1N5806

Symbol	Dimensions			
	Millimeters		Inches	
	Min	Max	Min	Max
A	2.16	2.31	.085	.091
B	1.83	1.93	.072	.076
C	0.18	0.28	.007	.011

1N5807, 1N5809, 1N5811

FIGURE 4. JANC (A-version) die dimensions.



Symbol	Dimensions			
	Millimeters		Inches	
	Min	Max	Min	Max
A	0.79	0.94	.031	.037
B	0.43	0.58	.017	.023
C	0.20	0.30	.008	.012

1N5802, 1N5804, 1N5806

Symbol	Dimensions			
	Millimeters		Inches	
	Min	Max	Min	Max
A	1.57	1.73	.062	.068
B	1.27	1.42	.050	.056
C	0.20	0.30	.008	.012

1N5807, 1N5809, 1N5811

FIGURE 5. JANC (B-version) die dimensions.

4.5.2 Thermal impedance. Thermal impedance $Z_{\theta JX}$ measurements shall be performed in accordance with MIL-STD-750, method 3101. The maximum limit for $Z_{\theta JX}$ in screening (table II of MIL-S-19500) shall be derived by each vendor by means of Statistical Process Control and applied in screening of all subsequent lots. This limit is not exceed the group A, subgroup 2 limit. The following conditions shall apply:

$I_H = 5 \text{ A minimum}$

$t_H = 10 \text{ ms}$

$I_H = 1 \text{ Ma to } 10 \text{ Ma}$

$t_{HD} = 100 \mu\text{s maximum}$

4.5.2.1 for Initial qualification and requalification. Read and record data ($Z_{\theta JX}$) shall be supplied to the qualifying activity on one lot (random sample of 500 devices minimum) prior to shipment. Twenty-two samples shall be serialized and provided to the qualifying activity for test correlation.

4.5.3 Scope-display evaluation. The reverse breakdown characteristics shall be viewed on an oscilloscope with display calibration factors of 50 to 100 μA per division and 20 to 50 V per division. Reverse current over the knee shall be at 500 μA minimum. Any discontinuity or dynamic instability of the trace shall be cause for rejection.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-S-19500.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Notes. The notes specified in MIL-S-19500 are applicable to this specification.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Issue of DODISS to be cited in the solicitation.
- b. Lead finish as specified (see 3.3.2).
- c. Product assurance level and type designation.

6.3 Suppliers of JANC die. The qualified JANC suppliers with the applicable letter version (example JANCA821) will be identified on the QPL.

JANC ordering information		
PIN	Manufacturer	
	14522	12969
1N5802	A5802	B5802
1N5804	A5804	B5804
1N5806	A5806	B5806
1N5807	A5807	B5807
1N5809	A5809	B5809
1N5811	A5811	B5811

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

MIL-S-19500/4778

CONCLUDING MATERIAL

Custodians:

Army - ER
Navy - EC
Air Force - 17
NASA - NA

Review activities:

Army - AR, AV, MI
Air Force - 19, 80, 85
DLA - ES

User activities:

Army - SM
Navy - AS, CG, IIC, OS, SH

Preparing activity:

Navy - EC

Agent:

DLA ES

(Project 5961-1210)